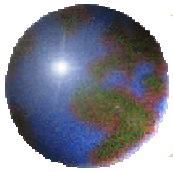
Be Prepared for Pandemic Flu:
Key Tools for Local Public Health

The Massachusetts
Department of Public Health and
The Local Public Health Institute
of Massachusetts
March 2006



“Flu?

If we but knew

The cause of flu

And whence it came and what to do,

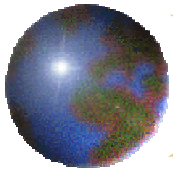
I think that you

And we folks, too,

Would hardly get in such a stew.

Do you?”

Illinois Health news, vol. 9, November 1918



This training covers…

- What is influenza?
- What is avian flu (H5N1)?
- What is an influenza pandemic?
- History of influenza pandemics
- How an influenza pandemic could affect communities in Massachusetts
- Control measures

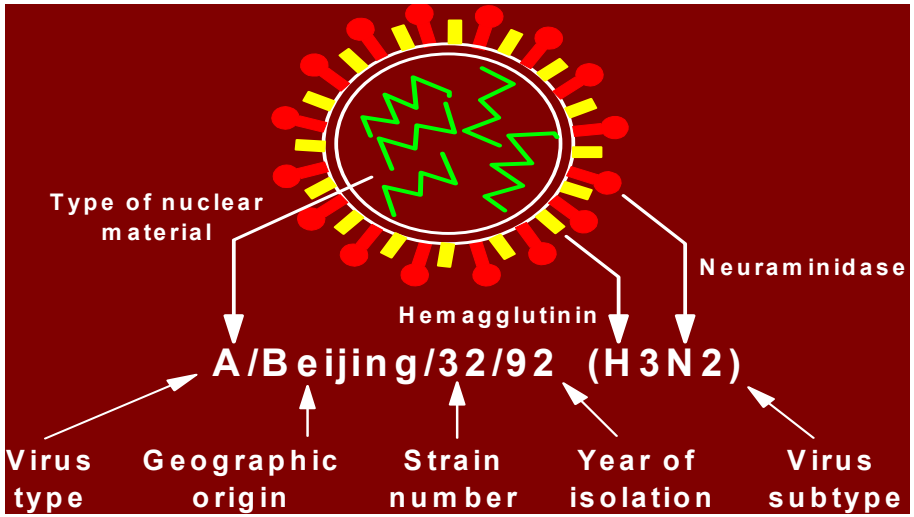
The purpose of this training is…

- To give local public health professionals **information and tools** needed to prepare for a pandemic flu outbreak
- To **complement related efforts** at the local level to prevent and control infectious disease

What is influenza?

- Respiratory infection
- Spread by: Contact with respiratory secretions from an infected person who is coughing and sneezing
- Incubation period: 1 to 5 days from exposure to onset of symptoms
- Contagious period: Maximum at onset, but infectious for 1-2 days before symptoms and at least 4-5 days after onset of symptoms
- In New England, flu season usually begins in Dec and peaks in Jan or Feb
- Pandemic influenza may occur at any time of year, but conditions most favor rapid spread during regular flu season

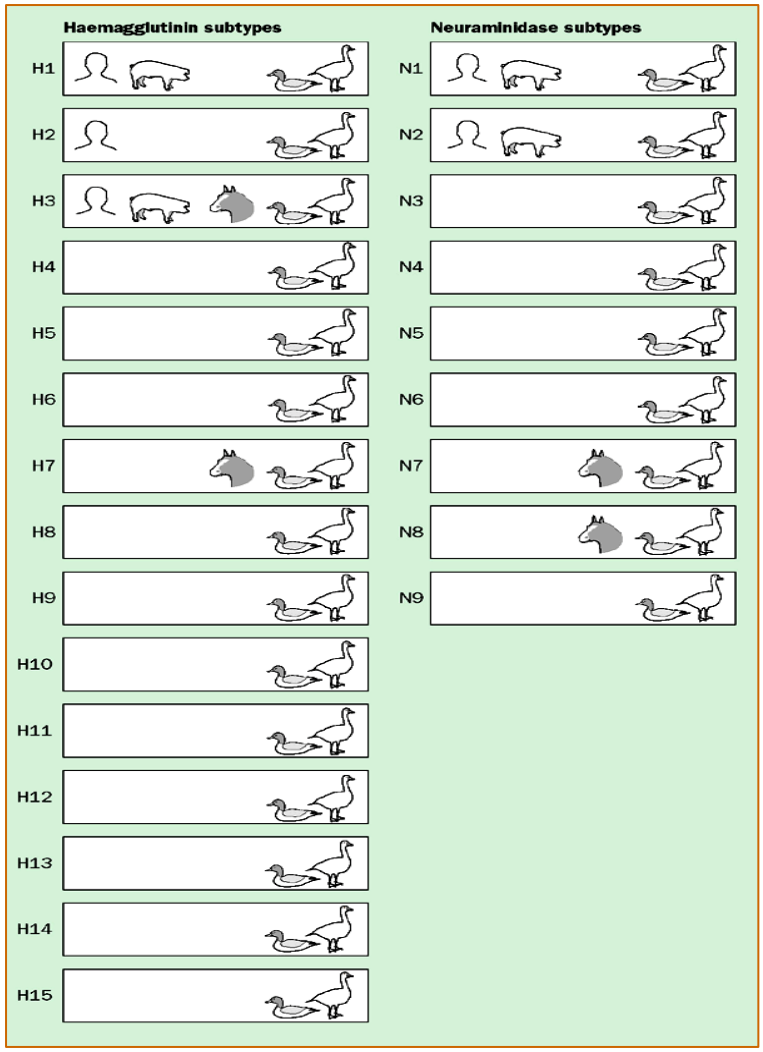
Influenza Virus Type A

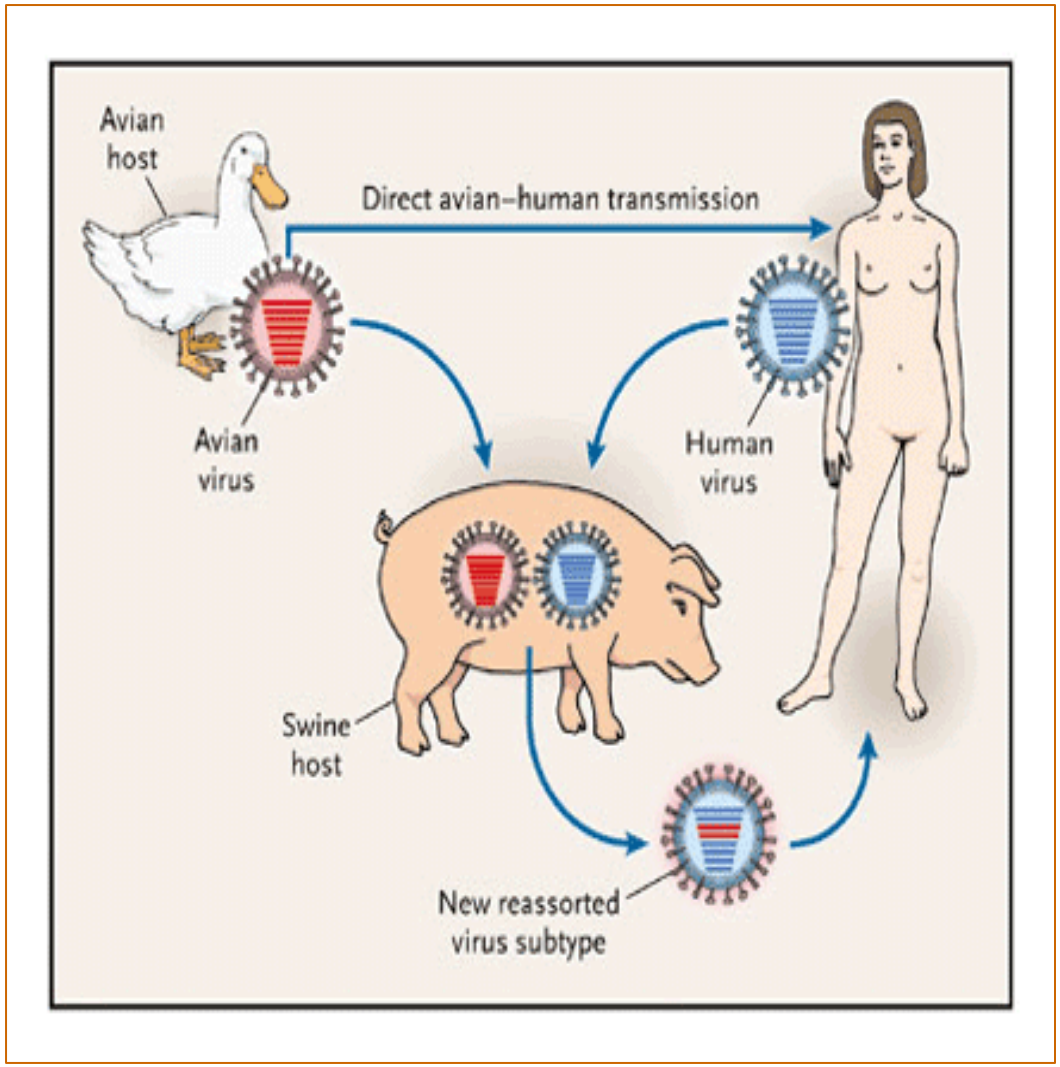


- Causes moderate to severe illness
- Affects all age groups
- Infects humans and other species, such as pigs and birds
- Associated with epidemics and pandemics

What is avian influenza (AI)?

- An infection caused by influenza A virus occurring naturally among birds; infects gastrointestinal tract
- Can be highly or minimally pathogenic for domestic birds
- Wild birds carry the virus without getting sick
  - Can travel long distances (migration) and carry AI around the world
  - Fecal transmission
- First documented case of highly pathogenic AI in humans occurred in Hong Kong in 1997 (influenza A H5N1)

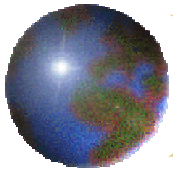

Haemagglutinin subtypes
H1
H2
H3
H4
H5
H6
H7
H8
H9
H10
H11
H12
H13
H14
H15
Neuraminidase subtypes
N1
N2
N3
N4
N5
N6
N7
N8
N9



Source : N Eng J Med 350;12:1243

Flu virus is constantly changing

- **Drift:** Minor change due to constant mutation
  - A reason why flu vaccine must be updated each year
- **Shift:** Major change with new virus causing human infection
  - **Pandemic potential**



What is a pandemic?

A sudden, widespread outbreak caused by a new strain of the influenza A virus.

Because the virus is new, virtually no one is immune - all exposed could get sick.

Influenza pandemics…

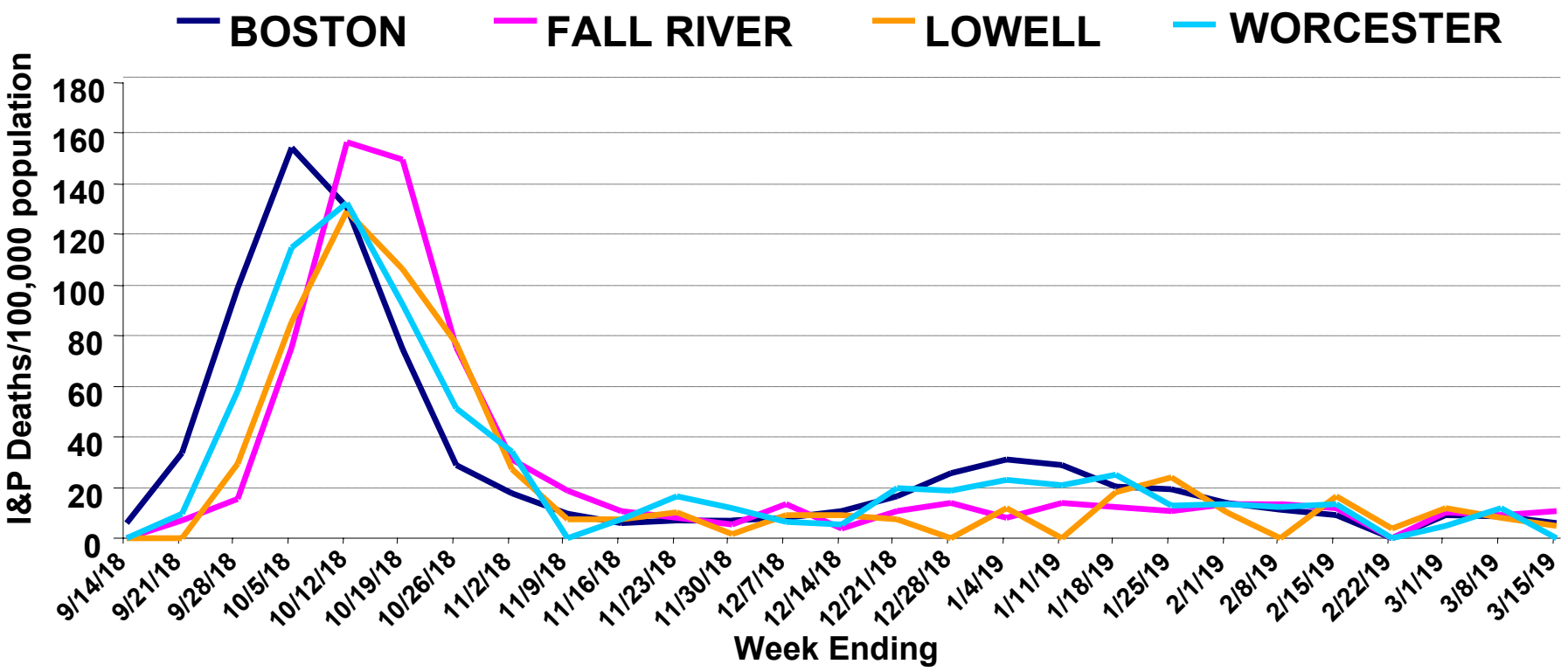
- Spread rapidly throughout the world
- Result in an unusually high number of cases and deaths
- Last 1 - 2 years; may have a second wave
- Occurred in 1918, 1957, 1968

1918 influenza pandemic

Most deadly outbreak of infectious disease ever

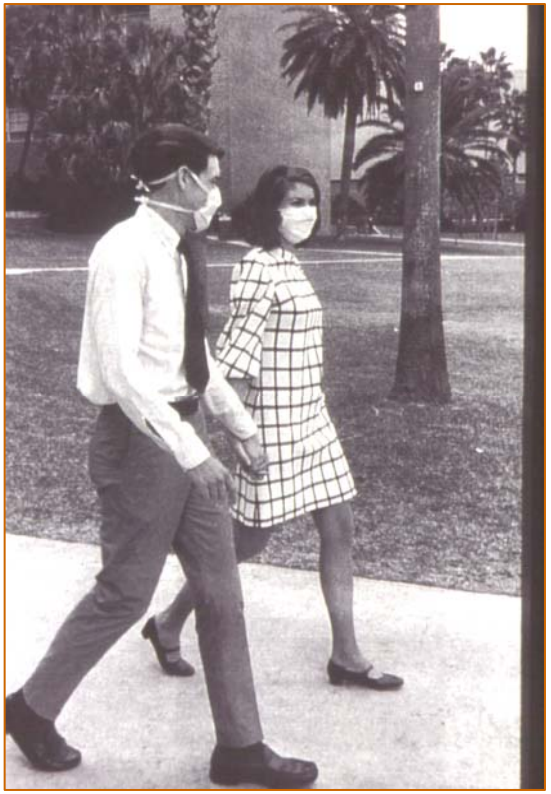
- 20 - 40 million or more died worldwide, 500,000 in U.S.
- 20% - 40% of population sick
- Quick to kill, especially healthy young adults

Influenza and Pneumonia Deaths Massachusetts Cities, 1918-19



1957 and 1968 influenza pandemics

- 1957 Asian Flu (H2N2)
  - 70,000 Americans died
- 1968 Hong Kong Flu (H3N2)
  - 34,000 Americans died



Avian influenza in humans (H5N1)

- Hong Kong, 1997
- Resulted in 18 human cases and 6 deaths
- Most transmission from chickens to humans
- Isolated instances of probable person-to-person transmission

Avian influenza in humans (H5N1)

- H5N1 in humans in Hong Kong (2003), Viet Nam (2004)
- Large H5N1 outbreak in poultry in Asia, 2003-05
- Many opportunities for transmission to humans

Confirmed human cases of H5N1 since 12/03 (as of March 21, 2006)

Country	Total Cases	Deaths
Turkey	12	4
Azerbaijan	7	5
Iraq	2	2
Cambodia	4	4
Indonesia	29	22
Thailand	22	14
Viet Nam	93	42
China	15	10
TOTAL	**184**	**103**

Notes: Total number of cases includes number of deaths.
WHO reports only laboratory-confirmed cases.

Why are we concerned?

- H5N1 mutates rapidly
  - 2004 virus more hardy than 1997 virus
  - Already resistant to some antivirals (amantadine)
  - Multiple strains circulating
- Spreading via migratory birds who have little to no apparent illness
- Poultry is an important source of income and protein for many in Asia
  - May be less likely to report H5N1 outbreaks in birds

Why are we concerned about influenza?

- Very short incubation period (1-4 days, typically 2 days)
- Infectious prior to symptoms
- Severe disease may occur in children and young adults
- H5N1 has crossed the species barrier to infect humans

Population susceptibility to an H5N1-like pandemic virus would be universal

Surveillance for H5N1 in Massachusetts

Immediately contact MDPH (617-983-6800) if patient:

- Hospitalized with x-ray-confirmed pneumonia or Acute Respiratory Distress Syndrome with no alternative diagnosis, **AND**
- Traveled to an area where birds have been affected by H5N1 within 10 days of symptom onset

Control Measures in the Community

Pre-pandemic (isolated cases):

- Use airborne infection isolation including N-95 respirators
- Hand hygiene

Pandemic (sustained human-to human transmission):

- Use droplet precautions
- Hand hygiene

Planning and action needed now

Despite . . .

- Expanded global and national surveillance
- Better healthcare, medicines, diagnostics
- Vaccines and antivirals

New risks:

- Greater population density
- Increased global travel and commerce
- More elderly and immunosuppressed

Potential impact of next pandemic in Massachusetts

Among our state's population of about 6.4 million could be…

- 2 million clinically ill
- 1 million outpatient visits
- 80,000 hospitalizations
- 20,000 deaths

Potential impact of next pandemic in Massachusetts

- Outbreaks will occur simultaneously throughout the U.S.
- Up to 40% absenteeism in all sectors at all levels
- Order and security disrupted for several months, not just hours or days

Potential impact of pandemic in MA

Existing facilities will be overwhelmed

Vaccine, antivirals, antibiotics will be in short supply

Potential impact of next pandemic in Massachusetts

Assumptions:

- Attack rate: 30%
- Hospitalization rate: 4.2% of ill (8.4% of those who seek care)
- Death rate: 1% of ill
- Duration of epidemic wave: 8 weeks
- Avg. length of non-ICU stay for flu related illness: 5 days
- Avg. length of ICU stay for flu related illness: 10 days
- Avg. length of ventilator usage for flu related illness: 10 days
- Avg. proportion of flu admissions requiring ICU care: 50%
- Avg. proportion of flu admissions requiring mechanical ventilation: 15%
- Avg. proportion of flu deaths assumed to be hospitalized: 70%
- Daily percentage increase of cases compared to previous day: 3%

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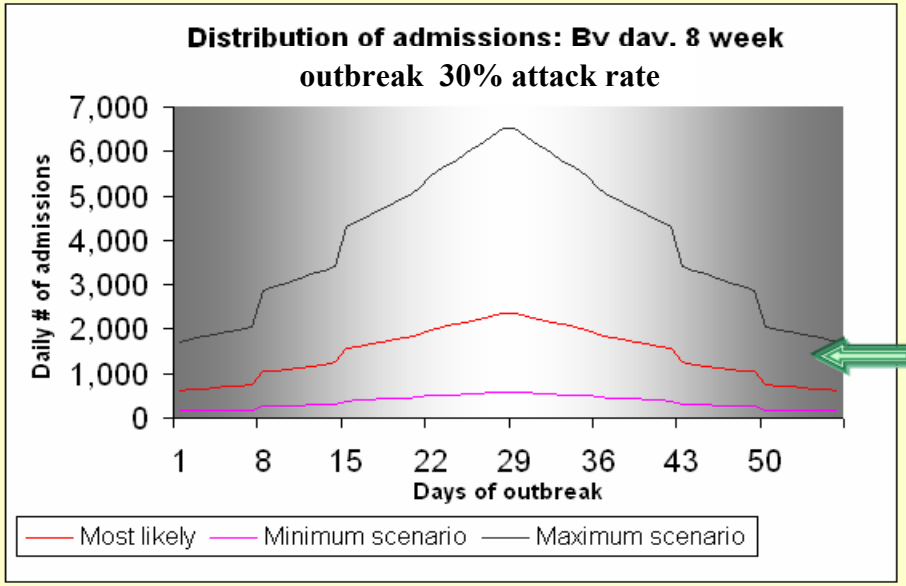


Total Hospital Admissions (most likely)	80,000
Total Deaths (most likely)	20,000

Pandemic Influenza Impact / Weeks		1	2	3	4	5	6	7	8	9	10
Hospital Admission	Weekly admissions	4,800	8,000	12,000	15,200	15,200	12,000	8,000	4,800		
	Peak admissions/day				2,369	2,369					
Hospital Capacity	# of influenza patients in hospital	3,528	5,881	8,821	11,173	11,569	10,169	7,799	5,116		
	% of hospital capacity needed	27%	44%	67%	84%	87%	77%	59%	39%		
ICU Capacity	# of influenza patients in ICU	2,400	5,090	7,816	10,324	11,173	10,869	8,637	5,964		
	% of ICU capacity needed	169%	358%	550%	726%	786%	764%	607%	419%		
Ventilator Capacity	# of influenza patients on ventilators	720	1,527	2,345	3,097	3,352	3,261	2,591	1,789		
	% usage of ventilator	87%	185%	284%	375%	406%	395%	314%	217%		
Deaths	# of deaths from influenza			1,200	2,000	3,000	3,800	3,800	3,000	2,000	1,200
	# of influenza deaths in hospital			840	1,400	2,100	2,660	2,660	2,100	1,400	840

Notes: 1. All results showed in this table are based on most likely scenario.

2. Number of influenza patients in hospital, in ICU, and number of influenza patients on ventilators are based on maximum daily number in a relevant week.

3. Hospital capacity used, ICU capacity used, and % usage of ventilator are calculated as a percentage of total capacity available (see manual for details).

4. The maximum number of influenza patients in the hospital each week is lower than the number of weekly admissions because we assume

Comparison of Pandemic Planning Numbers

	1957/68-like	**MDPH Surge Planning***	**1918-like**
# Ill	2 M (30%)	2 M (30%)	2 M (30%)
Hospitalizations	20,000 (1%)	80,000 (4%)	220,000 (11%)
ICU Care	2,746	Peak – 11,173	31,680
Mechanical Ventilation	1,368	Peak – 3,352	15,840
Deaths	4,600 (0.23%)	20,000 (1%)	42,000 (2.1%)

Surge Bed Definitions

- Level 1: Staffed and available
- Level 2: Licensed, Staffed
  - 2: Beds made available through patient discharge and transfers.
  - 2R: Beds made available through canceling of elective surgery, such as day surgery or endoscopies.
- Level 3: Licensed but not staffed
  - Generally equipped, including wall gases
- Level 4: Overflow beds in non-traditional patient care areas
  - Cafeterias, lobbies, etc.
  - Require equipment (including bed), supplies, and staff

Surge Bed Capacity vs. Need

	Levels 1 and 2	Level 3	Level 4 *	Total Bed Capacity	Total Beds Needed	Variance
1 (West.)	2,122	277	1,026	3,425	3,284	141
2 (Central)	1,948	460	579	2,987	2,867	120
3 (N.E.)	2,663	788	1,286	4,737	4,022	715
4AB (128)	2,879	740	915	4,534	5,096	(562)
4C (Bos.)	3,013	978	748	4,739	4,014	725
5 (S.E.)	2,761	324	517	3,283	4,277	(994)
STATE	15,061	3,567	5,071	23,705	23,560	145

Potential impact of next pandemic in your community

- Tools available to make an estimate:

FluAid: http://www2a.cdc.gov/od/fluaid/

FluSurge: http://www.cdc.gov/flu/flusurge.htm

- Build on statewide planning assumptions (30% attack rate)

Community-specific numbers get people's attention!

Pandemic Planning:Federal

- National Pandemic Influenza Preparedness Plan issued by the Department of Health and Human Services (HHS) in November 2005: www.pandemicflu.gov

Pandemic Planning: MA

- State/Local Pandemic Planning Committee
- Tabletop exercise
- Forum for legislators
- Briefing for the Governor
- Regional pandemic meeting
- Intensive Continuity of Operations planning
- Statewide Surge Committee
- Review and revision of State Plan; available at www.mass.gov/dph/cdc/epii/flu/statepln.pdf
- Public participation project

Massachusetts Pandemic Plan

- Incident command and control
- Surveillance
- Vaccine
- Antiviral drug use
- Communication
- Emergency response
- Other control measures

Massachusetts Pandemic Plan

MDPH has been identified as the lead coordinator for all of the Executive Office of Health and Human Services, as well as for the State Emergency Operations Centers.

Massachusetts Pandemic Plan

Surveillance

- Sentinel surveillance sites
- Year-round surveillance
- Syndromic surveillance

Massachusetts Pandemic Plan

Vaccine

- Cornerstone of prevention
- Won't be widely available in early stages
  - Prioritization necessary
  - Public participation project
- Will likely require 2 doses, a month apart for fuller protection

Massachusetts Pandemic Plan

Vaccine distribution

- Based on combination of current distribution system and the strategic national stockpile
- Vaccine priority groups are based on U.S. Dept. of Health & Human Services recommendations; current priority groups are in your training folder
- Local communities should have plans for administering vaccines to residents based on priority groups

Influenza antiviral drug use

- **Uses**
  - Prophylaxis – preventing influenza when exposed
  - Treatment – treating influenza
- **Issues**
  - Limited supply
  - Need for prioritization (among risk groups and prophylaxis versus treatment)
  - Unlikely to markedly affect course of pandemic
  - Resistance to antiviral agents occurs

Massachusetts Pandemic Plan

Communications

- Build on existing system
  - Health & Homeland Alert Network (HHAN), MDPH website (www.mass.gov/dph/flu), conference calls
- Hotlines: consumer & public clinic
- Risk communication template for local public health
- Library of materials
  - Education to encourage self-diagnosis
  - Public health information (risks, risk avoidance, advice on universal hygiene behavior)

Massachusetts Pandemic Plan

Emergency Response

- Continuity of Operations Planning template to address 40% absenteeism
- Plans to meet the needs of people confined to their homes
- Surge capacity planning

Other control measures

- Hand hygiene (washing and alcohol-based products)
- Respiratory hygiene and coughing etiquette
- Social distancing

Local infectious disease emergency planning

Most of the impact and most of the response will be local.

Resource: Template for Local Infectious Disease Emergency Planning and Response (IDEP)

- Developed with input from the State/Local Pandemic Planning Committee

http://www.mass.gov/dph/topics/bioterrorism/idep.doc

Resource: Emergency Dispensing Site Management and Operations

www.mass.gov/dph/bioterrorism/advisorygrps/pdfs/emergency_dispensing_site_3_05.pdf

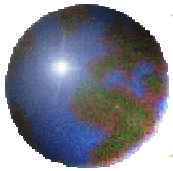
Resource: Emergency Dispensing Site Management and Operations

- MHOA Template for Emergency Preparedness

www.mhoa.com/mhoa/bio.htm

Use every influenza season to…

- Enhance infrastructure
- Expand expertise implementing large vaccination clinics
- Develop trained volunteers
- Involve your Local Emergency Planning Committee (LEPC)
- Exercise and enhance your Emergency Dispensing Site (EDS) plan



Vaccinate everyone at risk for pneumococcal disease **now**

- Common complication of influenza
- Increasingly antibiotic-resistant
- Unable to conduct pneumococcal vaccine campaigns during pandemic

Vaccinating everyone at risk for pneumococcal disease protects them now, and during the next pandemic!

MDPH Flu Web Site

- Link to MassPRO flu clinic site
- Consumer Information
- Provider Guidelines
- Pandemic Planning
- Pneumococcal Information
- Links to CDC sites

www.mass.gov/dph

Influenza Information